PLASTICS ENGINEERING*
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Heating With Far Infra-Red

Non-color conscious characteristics of radiation make it equally efficient for heating all colors of plastics used in coating, forming, and embossing

by Frank Perrotta†

INFRA-red radiation has been used as a heat source by the plastics industry for many years. Its applications include drying and preheating materials as well as curing and fusing resins. Most familiar source of infra-red radiation is the standard "heat-lamp," which produces its heat in or near the visible portion of the spectrum. Such radiation is transmitted by transparent materials and is almost entirely reflected by white opaque materials. The bulbs of these lamps operate at a filament temperature of 4873° F.

The inherent advantages of infra-red radiant heat have been made more widely applicable by the development of a heat source entirely different from and more efficient than the conventional infra-red bulb. This new source, consisting of a Chromalox tubular heater, entirely enclosed in an Inconel sheath, operates at a surface temperature of 1000 to 1400 F., and hence its radiation is completely in the invisible or "far infra-red" portion of the spectrum. The effective wavelength range is from 2 to 16 microns and the radiation emanates from the heater unit in a focussed pattern. These units are being manufactured by Edwin L. Wiegand Co., Pittsburgh, Pa.

The big difference between infra-red radiation from a heat lamp and far infra-red radiation from a Chromalox unit is that the latter is not color conscious; that is, it heats all colors of materials uniformly from white through black, with maximum absorption and negligible reflection even by white. This factor of uniform heating is of particular value in such applications as fusing plastisols or organisols and heating film and sheet prior to embossing or vacuum forming.

Heaters

In one commercial type of far infra-red heater, the heater element is positioned at the focal point

* Reg. U.S. Pat. Office.
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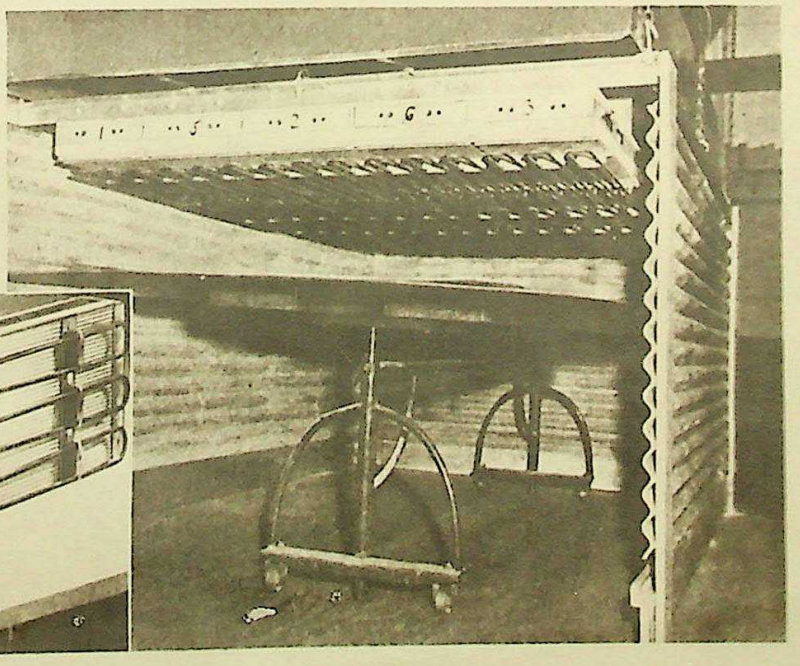
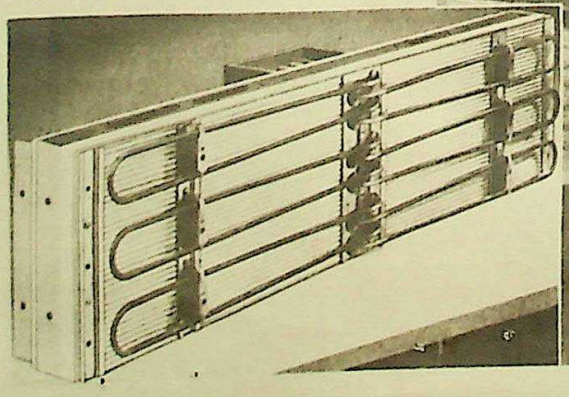
Photos courtesy Edwin L. Wiegand Co



Latest type of far infra-red radiant heating panel provides complete oven wall construction, including structural members, insulation, and air venting space. This type of "package heater" needs no cooling

Below: One unit of heating panel, five of which are shown in use at the right